Aquaguide: Fish Kills in Ponds and Lakes

Fish kills in Missouri ponds and small lakes usually occur during summer and winter, but they may happen any time during the year. Fish kills are usually related to low oxygen levels; however, pollution, fish diseases and a phenomenon known as turnover can also kill fish.

Unfortunately, once fish begin dying, it is usually too late to do anything. The best method to prevent fish kills is good pond management, which begins with proper pond construction and watershed maintenance.

LOW OXYGEN - SUMMER

Like most creatures, fish require oxygen to live. The amount of oxygen in a body of water will vary with water temperature, aquatic plant densities and amount of sunlight.

As water temperatures increase, water loses its capacity to "hold" oxygen. Unfortunately, as water warms, the cold-blooded fish become more active and require more oxygen.

Larger fish of any species are usually the first to die when oxygen concentrations become too low. Desirable fish species, such as grass carp, bass, channel catfish and bluegill, are more susceptible to low oxygen levels than bullheads, carp and other less desirable species.

Aquatic plants are generally considered beneficial to bodies of water because they produce oxygen. As the amount of sunlight decreases, however, plants use more oxygen than they produce. At night and during periods of low light, vegetation actually competes with fish for oxygen. Decomposing vegetation also requires oxygen, making less available to fish. Studies show that summer oxygen levels are usually lowest just before sunrise and after extended periods of cloudy weather.

Ponds and small lakes are vulnerable to summer fish kills when vegetation covers 20 percent or more of the water surface. Ponds that turn a pea-soup color from microscopic algae are also subject to fish kills.

Fish swimming near the surface of the water and appearing to be gulping air indicate a low oxygen problem. A quick response can be the difference between losing or saving the fish in your pond or lake.

Because oxygen is in short supply, you must provide it by aerating the water or by adding large quantities of fresh, oxygenated water. Aeration is usually easiest and on small ponds can be accomplished with a pump and nozzle or a boat motor, using water from the pond itself. Water molecules will pick up oxygen from the air, so redepositing the water in a fine misty spray works best. Well water can also be used but, because it is low in oxygen, must be sprayed onto the pond’s surface to be effective.

Commercial surface aerators may be necessary to increase oxygen levels in larger ponds and lakes.

Keep in mind that aeration is only a remedy for low oxygen levels, not a cure for them. Proper watershed, pond and aquatic plant management practices (refer to other Aquaguides for information about these practices) will help you control excessive vegetation and prevent fish kills from occuring.

Should chemical control of excessive aquatic vegetation become necessary, avoid treatment when water temperatures are warm, since decaying vegetation will lower oxygen levels even further.

Apply chemicals to no more than 1/3 of the vegetation at one time and only when water temperatures are below 80 degrees.

During extremely warm weather, when water temperatures exceed 85 degrees, it's a good idea to reduce or stop feeding fish supplemental foods, because uneaten feed sinks to the bottom and decomposes, further lowering oxygen levels.

Most ponds produce an ample supply of natural foods, so there is no need to worry about the fish going hungry.

LOW OXYGEN - WINTER

Excessive vegetation can be just as detrimental under the ice as during summer. Sunlight can penetrate several inches of clear ice, but a small amount of snow atop the ice can block nearly all light from the water.

Without light, plants cannot produce oxygen and will eventually die. When dead plant material decomposes it consumes oxygen. Large amounts of decaying plant materials can reduce oxygen in water to levels lethal to fish.

To prevent winterkill, try to keep a portion of the ice free of snow to permit sunlight to reach plants and result in more oxygen production. This is especially important in shallow ponds with extensive areas less than eight feet deep and an abundance of aquatic vegetation. Create "windows" by shoveling snow off in blocks about 10 feet square in various parts of the pond; the more of them the better.

Make sure the ice is safe before walking onto the pond. As a general rule, four inches or more of clear ice is enough to support anyone.

POLLUTION

During the spring and fall rainy seasons, runoff from feed lots, crop land and fertilized lawns can lead to fish kills.

Heavy rains can wash large amounts of nutrients and fertilizers into ponds, accelerating plant growth which can lead to oxygen depletion. Proper watershed management includes diverting or eliminating the sources of excessive nutrients (phosphorous, nitrogen) so they do not threaten fish life in ponds.

Chemicals, including herbicides and pesticides, entering a pond can directly lead to fish kills. Ammonia, which comes from animal wastes, is highly toxic to fish. Toxic chemicals usually

affect all species and all sizes of fish.

The majority of chemical fish kills can be avoided by carefully following all label directions, especially when applying chemicals near water. If you suspect that a fish kill was caused by chemicals, look for possible sources within the pond's watershed.

DISEASES

Early spring can be a dangerous time for fish. As water temperatures rise, populations of disease-causing organisms, such as bacteria and parasites, increase. These organisms can infest fish weakened by spawning actitivies and the stresses of winter and, if abundant, may kill them.

Diseases in ponds seldom kill all the fish and are likely to affect only one or two species. In most cases, it is impractical to treat the pond or the diseased fish. Fish populations usually rebound quickly.

TURNOVER

Turnover occurs in the spring and fall when surface water mixes with water from near the bottom that may contain little or no oxygen (See "Pond and Lake Turnover" Aquaguide). Gasses potentially lethal to fish that have built up in the pond's deepest water are slowly circulated throughout the pond and eventually released into the atmosphere.

Turnover is usually gradual and not harmful to fish. However, if strong winds, cold fall rains or rapid temperature changes accelerate the turnover process, fish can die as a result of being suddenly exposed to low quality water.

CONCLUSION

Fish kills can be caused by natural or manmade events, but your pond does not have to be one of the victims. Maintaining a well- vegetated watershed, adequate pond water depth (especially around shoreline areas) and moderate aquatic plant densities will help prevent most problems. If you have any questions about fish kills or other fisheries related topics, contact the nearest Department of Conservation Fisheries District office.

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